

CASE REPORT

A Rarity of Triad Dental Anomalies Occurrence in a Non-Syndromic Indian Patient

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Abstract

Human teeth undergo several developmental changes due to nature's continuous evolutionary phenomenon. As a result, variations in tooth shape, size, number and eruption pattern can be found in humans and the prevalence may vary among different population. 'Mesiodens' is a supernumerary tooth, which occur with different forms and can be seen erupted or remain impacted. Mesiodens is the one which cause delay in eruption of the permanent incisors or interfere with their eruption. Maxillary canine tooth is the most commonly observed tooth to

be found as impacted. Therefore, occurrence of different multiple dental anomalies or variations in a single, non-syndromic patient is an uncommon scenario. Previous literature shows documentation of either any one form dental variation. Reports on occurrence of three or more different dental anomalies or variations are rarely documented. Therefore, aim of the present case report is to showcase an interesting case consisting of impacted permanent central incisor, impacted molariform mesiodens and horizontally impacted permanent maxillary canine which all occurred in a single non-syndromic Indian patient.

Key Words: *Canine impaction; Dental anomalies; Maxillary central incisor; Supernumerary tooth; Tooth impaction*

Introduction

Presence of maxillary central incisor in the dental arch is essential for easy phonetics, mastication and facial esthetics in a patient. Therefore, if a maxillary central incisor is missing or remains

unerupted, it can cause plethora of complications finally leading to decreased self-esteem of the patient. Impaction of maxillary central incisors is definitely an uncommon dental entity with countable number of reports reported so far [1-4] (Table 1).

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TABLE 1**Reported publications on impaction of permanent maxillary incisors.**

Sl. No	Author/Year	Impacted central incisor	Associated anomalies	Journal name
1	Nagaveni et al/2023 [2]	Right	2 vertical mesiodens, one erupted, one impacted	EC Dental Science
2	Nagaveni et al/2023 [1]	Right	None	Global journal of Research in Dental Sciences
3	Kumar et al/2012 [4]	Right lateral incisor	Transmigration of right canine	Imaging Science in Dentistry
4	Pinho T/2012 [3]	Bilateral (both right and left)	Impacted maxillary left canine	American Journal of Dentofacial Orthopaedics
5	Present case/2025	Left	Horizontal Impaction of maxillary left canine. Impacted anomalous supernumerary tooth	-

Literature shows numerous etiological factors for the delayed eruption of the maxillary central incisor, however, presence of mesiodens is the most common causative factor for the impaction of maxillary central incisor [5-10]. Mesiodens is a supernumerary tooth which occur in the dental midline either in maxillary or mandibular arch. Different forms of mesiodens such as conical, multi-lobed, tuberculated, supplemental and molariform type have been reported based on the morphology of the supernumerary tooth. Among these types, development of molariform mesiodens in the maxillary arch is a rare phenomenon with scanty case reports published so far [11,12]. The exact prevalence of molariform mesiodens is not mentioned in the literature and only a few case reports available. However, overall prevalence of mesiodens in the permanent dentition varies from 0.15% to 3.8% [5-9]. Published reports illustrates only erupted type of molariform mesiodens. Articles on impacted molariform mesiodens are not reported till date according to authors' best knowledge. Hence, the present article is the first report on occurrence of impacted molariform mesiodens.

The prevalence of impacted permanent canines differs by ethnicity and geographic location studied ranging from approximately 0.8% to

9.5% [13,14]. Maxillary canine is the most common tooth to get remained unerupted and get impacted in the bone with right being particularly involved with impaction in some population s[13]. Most of the impacted maxillary canines either remain in their position or move either mesially or distally within the bone [13,14]. Various forms of canine impactions have been mentioned in the literature [15]. Among those, horizontal impaction is a rarely reported finding. Development of multiple dental anomalies with different unusual dental variations in a non-syndromic patient clearly signifies, need for extensive research work under the domain of 'dental anomalies and variations.' Advanced research work enables academicians and researchers to make precise guidelines including diagnostic, therapeutic and classification criteria in order to provide best treatment care to the patient. Keeping this fact, the present article was designed to present a rare combination of three different dental variations which all together occurred in Indian male patient.

Case Report

A 15-year-old male patient reported to a private dental clinic complaining of missing tooth in the upper front region of the mouth. Patient was moderately built and nourished with well

exhibited behaviour. There were no signs and symptoms of any systemic, metabolic or syndromic disorders noticed. On intraoral examination patient exhibited complete set of erupted permanent teeth excluding third molars. On further examination it was found that, in the maxillary anterior region, a wide space was present with clinically missing 21 and 23. Beside to 22, there was no space existed rather 24 (first premolar) was found located adjacent to 22. Remaining all teeth showed normal structure, size and shape without any obvious pathology. To rule out missing teeth, patient subjected to radiographic examination, which revealed impacted 21, 23 and a supernumerary tooth (Figure 1). Compared to erupted 11 (right central incisor), the impacted 21 exhibited normal crown and root morphology, but with shorter root length. The root apex was completely formed and closed. When impacted 23 was studied, it was horizontally placed over the root apices of 22, 24 and 25 with crown directed in mesial and root distal direction. The crown and root morphology appeared normal with completely closed root apex. In place of 22, an anomalous tooth structure was observed with its crown directing facial aspect and root palatal. The crown structure of the supernumerary tooth was found squarish form with four cusps. In place of 23, 22 (lateral incisor) was erupted. Apart from these dental findings no other peculiar observations were found. Based on the literature search, a diagnosis of impaction of the 21 (left central incisor), horizontal impaction of the 23 (left canine) and 'molariform' mesiodens was made. Patient was explained about the presence of dental findings and a treatment plan of surgical removal of impacted mesiodens followed by orthodontic traction of the impacted 21 and 23 was planned and scheduled for the treatment. Patient consent was taken to publish the rare occurrence of this dental variation.

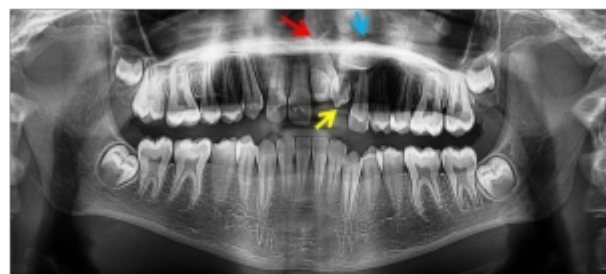


Figure 1) Orthopantomograph showing impacted permanent left central incisor (red arrow), horizontal impaction of the left permanent canine (blue arrow) and an anomalous supernumerary tooth (yellow arrow).

Discussion

The present case unique from other previously reported publications highlighting occurrence of impacted maxillary central incisor, horizontally impacted maxillary permanent canine and impacted molariform mesiodens. Previous reports showed scanty publications on impaction of maxillary central incisor. Although molariform mesiodens have been reported but impacted molariform mesiodens is not reported so far. In addition to this a horizontally impacted permanent canine was also noticed in the patient. Combination of all these different developmental dental patterns is not reported till date. Modern technological era is more surprising and excited with numerous advanced diagnostic methods which ultimately enhance the quality of diagnostic criteria in the realm of pediatric dentistry. Numerous dental anomalies and variations have been published in the dental literature [1-15]. Maxillary central incisor becoming totally impacted is a rare condition with few reports published so far (Table 1). In 93% of the cases, presence of a supernumerary tooth results in impaction of the maxillary central incisor. The detailed study of morphology of impacted central incisor and its position is of utmost important to arrive at therapeutic diagnostic opinion. Across-sectional study using cone-beam computed tomography scan evaluated the 3-dimensional position of the impacted maxillary central incisors in Chinese

children [16]. Authors categorized different patterns of impaction into numerous types as shown in (Table 2). Although CBCT was not taken in the present case, based on its position following conventional panoramic radiographic examination, the impacted central incisor could be categorised as vertical impaction. When a central incisor gets impacted it may locate in its original position or may see moved within the arch either distal or mesial. When it crosses the dental midline then that phenomenon is termed as ‘dental transmigration’ [1,12-15].

TABLE 2
Cone-beam computed tomography assisted classification of impacted maxillary central incisor.

Type	Pattern of impaction
Type 1	Vertical
Type 2	Horizontal
Type 3	Centred
Type 4	Inverted
Type 5	Distal
Type 6	Mesial
Type 7	Labial
Type 8	Palatal
Type 9	Low inclined
Type 10	High
Type 11	Middle

A systematic review evaluated the morphology of impacted maxillary central incisors in comparison with contralateral central incisors as it affects the treatment outcome. From this review, it was evident that, the root lengths of impacted maxillary central incisors were significantly shorter compared to the contralateral incisors [17]. The frequency of root dilacerations with severity increased as dental age increased. Lana Martiello et al. [18] investigated the crown and root characteristics of impacted central incisors in comparison with normal erupted incisors and also studied the influence of local factors on the dimensions of impacted central incisors. Results of the study

revealed a statistically significant difference in root length, labiolingual crown-root angulation and mesiodistal crown-root angulation of the impacted central incisors. Local etiological factors did not show any influence on dimensions of the impacted incisors. It was also evident that females exhibited shorter root length compared to males. In the present case too, when root length was measured it found to be shorter compared to right erupted central incisor. However, in contrast to Lana Martiello et al. [18] no root dilaceration or angulation was observed rather it appeared straight.

Treatment for impacted central incisor includes multidisciplinary approach with long duration of treatment plan involving both pediatric dentist and an orthodontist. Dmtrenko et al. [7] discussed treatment algorithms of patients consisting of impacted maxillary central incisor which occurred due to presence of supernumerary teeth. Authors reported that patients having impacted maxillary central incisors caused by supernumerary teeth must undergo orthodontic treatment in several stages. Another research work postulated clinical recommendations for the management of supernumerary tooth and unerupted permanent maxillary central incisors [19]. They are: 1. A sufficient arch space should be orthodontically created for permanent maxillary central incisors 2. Early surgical removal of a mesiodens before the age of 7 years followed by combined surgical exposure and orthodontic movement of the impacted incisor and 3. In case of complete impaction, orthodontic traction of the impacted tooth should be considered [19]. Considering different treatment guidelines as mentioned in the available literature, surgical removal of the impacted molariform mesiodens followed by orthodontic pulling of the impacted both central and canine was planned in the present case. Following extraction of the mesiodens space

will be obtained which enables orthodontic movement of impacted canine and central incisor. Following extraction first central incisor is moved, then lateral incisor is moved mesially followed by movement of the canine to its specific location.

Supernumerary tooth being an extra tooth is the most causative factor leading to impaction of the central incisors [1-3, 11-15]. Based on the location and morphology (shape) of the supernumerary tooth, they are classified into different types. According to location they are classified as mesiodens, paramolars, distomolars and parapremolars. Among them 'mesiodens' are the one which are located in the dental midline between two teeth. With context with mesiodens, based on morphology mesiodens are broadly categorized into supplemental, conical, tuberculated, molariform and multicusped with most common shape reported is the conical type [6-14]. Molariform mesiodens is rarely reported in the literature with all reported are erupted. In addition to the above types Nagaveni et al. an Indian author has done an extensive research work on dental anomalies and further published an unusual form of mesiodens associated with other dental anomalies like dens invaginatus and talon cusp [1,2,6,8,9]. In another case report three-lobed mesiodens has been reported. In the present case the mesiodens was found impacted and located in the place of 22. The crown morphology appeared abnormal squarish pattern. It neither resembled conical or tuberculate type. Therefore, based on literature evidence, the supernumerary tooth was categorized as 'molariform' type. Hence this case is different from previous reports showing impacted molariform mesiodens. As molariform mesiodens was impacted in labio-palatal direction, there was no visible shadow hidden under the impacted left canine. Conventional imaging scans like orthopantomogram provide

only two-dimensional picture of the tooth obscuring other important aspects of the pathology. During treatment also there are chances of damaging vital anatomic structures which are in close proximity to the tooth. Hence, to rule out its exact location, three-dimensional status of the tooth and relation with the adjacent anatomic structures, always 3-dimensional imaging techniques like Cone-Beam Computed Tomography (CBCT) scan will be really helpful as it provides a three-dimensional picture of the tooth which helps in proper diagnosis and treatment plan. But unfortunately, in the present case, CBCT imaging could not be performed due to increased cost and unaffordability of the patient.

Regarding canine impaction, early diagnosis and interceptive treatment of the maxillary canine impaction in children is very important in order to overcome the adverse future sequel and to decrease the complexity of the treatment plan [20-22]. A Malaysian study using panoramic radiographs evaluated the mean maxillary canine position among 9-10-year-old children to predict the risk of impaction of maxillary canines [20]. Study revealed that there was low risk of impaction of maxillary canines among Malaysian children. Kolokitha et al. [21] recently conducted a radiological study among mixed dentition children's cohort to find out association between maxillary canine impaction and other dental anomalies. Results of the study demonstrated a significant difference for peg-shaped maxillary lateral incisors and infraocclusion of primary molars. The presence of peg-shaped maxillary lateral incisor increased the probability of impacted canines to 83 % and impaction of any other teeth 80% [21]. Therefore, presence of peg-shaped maxillary lateral incisors and infraocclusion of primary molars were considered as major early risk factors for maxillary canine impaction as

they manifest before the eruption of maxillary canines [22,23]. This highly indicates that special attention should be given for impaction of any other teeth and represents that these dental anomalies are best patients for future interceptive treatment for canine eruption.

Presence of multiple dental anomalies usually seen in syndromic patients. However, in the present case three different dental variations occurred in a single non-syndromic patient. Detailed clinical examination of the patient was carried out to rule out possible suspected syndromes which resulted negative report. Even family history did not show presence of such dental anomalies or syndromic incidence among family members. Although syndromic markers or genetic counselling could not be performed in the present case, thorough clinical examination strongly suggested patient with non-syndromic healthy individual. Therefore,

based on clinical examination and radiographic examination, the present case was categorised as non-syndromic condition associated with multiple dental variations.

Conclusion

As supernumerary tooth always interferes with eruption of permanent teeth, patients with any delay in normal eruption pattern of permanent teeth should be subjected to thorough diagnostic protocols in order to rule out hidden dental developmental variations. Therefore, knowledge about its occurrence and its sequelae among all paediatric dentists is highly essential to arrive at proper diagnosis and also to provide age-appropriate treatment when required. For both clinicians and researchers, it is a focus of interest to perform more evidence-based research in order to enrich the treasure of knowledge pertaining to dental anomalies and its variations among all population.

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